

Curriculum Vitae

EDUCATION

- 2011 **California Institute of Technology**
 - PhD in Planetary Sciences. Thesis Advisor: Prof. Yuk L. Yung
- 2008 **California Institute of Technology**
 - Master in Planetary Sciences
- 2006 **Iowa State University**
 - Master in Atmospheric Sciences. Thesis Advisor: Prof. William Gallus
- 2003 **Nanjing University**, China
 - Bachelor of Science in Atmospheric Sciences

PROFESSIONAL EXPERIENCE

- 2015 – Present: Assistant Research, **Joint Institute for Regional Earth System Science & Engineering, University of California, Los Angeles**
 - Developed CH₄ retrieval algorithm for the prototype HyTES instrument
 - Benchmarked IPCC models using observed ozone radiative kernels
- 2013 – 2015: Assistant Scientist, **California Institute of Technology**
 - Improved estimate of oceanic OCS flux
 - Estimated the carbon flux from JAXA GOSAT CO₂ data using WRF-STILT
- 2011 – 2013: Postdoctoral Scholar, **Jet Propulsion Laboratory, California Institute of Technology**
 - Validated total column CO₂ using Total Carbon Column Observing Network (TCCON) near-infrared (NIR) observations
 - Developed retrieved algorithm for vertical CO₂ profile using combined TCCON and TES measurements
 - Developed carbonyl sulfide (OCS) retrieval algorithm from NASA Tropospheric Emission Spectrometer (TES) measurement
- 2003 – 2011: Research Assistant
 - 2006 – 2011: **California Institute of Technology**
 - Developed infrared-channel selection algorithm for tropospheric CO₂ retrieval
 - Developed CO₂ vertical profile retrieval algorithm using synthetic Orbiting Carbon Observatory (OCO) near-IR spectra
 - Studied the solar-cycle influence on stratospheric quasi-biannual oscillation
 - Studied the plumes at the South Pole of Enceladus
 - 2003 – 2006: **Iowa State University**
 - Simulated tornado-induced wind loads on built structures
- 2006 – 2011: Teaching Assistant
 - 2008 – 2010: **California Institute of Technology**
 - Introduction of Planetary Science (1 quarter)
 - Atmospheric Radiation (2 quarters)
 - 2004: **Iowa State University**
 - Synoptic Meteorology (1 semester)

SELECTED PROPOSALS

1. Methane concentration retrievals from JPL HYTES instrument over dairy and fossil fuel producers, PI: John R Worden, Co-I: **Le Kuai**, JPL-RTD: #R.15.021.092.
2. JPL Rapid Response to Aliso Canyon Gas Leak: (Co-I) Support HyTES processing efforts, PI: Riley Duren, Co-I: **Le Kuai**, Stan Sander, Clare Wong, Tom Pongetti, David Thompson, Andrew Thorpe, Glynn Hulley, John Worden, Nick Vance, #15-RRNES15-0028
3. NASA Carbon Monitoring System (CMS): Prototype Methane Monitoring System For California, PI: Riley Duren, Co-I: Christian Frankenberg, David R. Thompson, Andrew K. Thorpe, **Le Kuai**, Francesca Hopkins, Geogio Matheou; Collaboratore: Joe Roberts, Daniel Jacob, Bart Croes, Laki Tispoulos, Abhinav Guha, Abhinav Guha, Trina Martynowicz, Kate Larsen, Ian Lloyd, #15-CMS15-0062.

PENDING PROPOSALS

1. Investigation of CO₂ variability and contributions from ecosystems during drought conditions, PI: Xun Jiang, collaborator: **Le Kuai**, #16-CARBON16-0009.
2. A synergistic study of biosphere-atmosphere exchange of CO₂, PI: Yuk L Yung, collaborator: **Le Kuai**, #16-IDS16-0043.

PUBLICATIONS

15. Hopkins, F. M., R. M. Duren, C. E. Miller, A. Aubrey, M. Falk, L. Holland, S. J. Hook, G. C. Hulley, B. Johnson, **L. Kuai**, T. Kuwayama, T. Lauvaux, J. Lin, A. Thorpe, J. Worden (2016): Large anthropogenic methane point sources contribute significantly to regional emissions in the southern San Joaquin Valley, *in preparation for PNAS*.
14. S. S. Kulawik, C. O'Dell, V. H. Payne, **L. Kuai**, H. M. Worden, C. Sweeney, S. C. Biraud, E. Dlugokencky, L. Iraci, E. Yates, T. Tanaka (2016): Lower-tropospheric CO₂ from near infrared ACOS-GOSAT observations, *Atmos. Chem. Phys. Discuss.*, under review.
13. **Kuai, L.**, K. W. Bowman, H. M. Worden, K. Li, R. L. Herman, S. S. Kulawik (2016): Hydrological controls on the tropospheric ozone greenhouse gas effect, *Elementa*, under review.
12. **Kuai, L.**, J. R. Worden, K.-F. Li, G. C. Hulley, F. M. Hopkins, C. E. Miller, S. J. Hook, R. M. Duren, and A. D. Aubrey (2016): Characterization of anthropogenic methane plumes with the Hyperspectral Thermal Emission Spectrometer (HyTES): a retrieval method and error analysis, *Atmos. Meas. Tech.*, 9, 3165–3173, doi:10.5194/amt-9-3165-2016.
11. Hulley, G. C., R. M. Duren, F. M. Hopkins, S. J. Hook, N. Vance, P. Guillevic, W. R. Johnson, B. T. Eng, J. M. Mihaly, V. M. Jovanovic, S. L. Chazanoff, Z. K. Staniszewski, **L. Kuai**, J. R. Worden, C. Frankenberg, G. Rivera, A. D. Aubrey, C. E. Miller, N. K. Malakar, J. M. Sánchez Tomás, and K. T. Holmes (2016): High spatial resolution imaging of methane and other trace gases with the airborne Hyperspectral Thermal Emission Spectrometer (HyTES), *Atmos. Meas. Tech.*, 9, 2393–2408, doi:10.5194/amt-9-2393-2016.
10. **Kuai, L.**, J. R. Worden, J. E. Campbell, S. S. Kulawik, K.-F. Li, M. Lee, R. J. Weidner, S. A. Montzka, F. Moore, J. A. Berry, I. Baker, A. S. Denning, H. Bian, K. W. Bowman, J. Liu, Y. L. Yung (2015): Estimate of Carbonyl Sulfide Tropical Oceanic Surface Fluxes Using Aura Tropospheric Emission Spectrometer Observations, *J. Geophys. Res. Atmos.*, 120, 11012–11023, doi:10.1002/2015JD023493.
9. **Kuai, L.**, J. Worden, S. S. Kulawik, S. A. Montzka, and J. Liu (2014): Characterization of Aura TES carbonyl sulfide retrievals over ocean, *Atmos. Meas. Tech.*, 7, 163–172, doi:10.5194/amt-7-163-2014.
8. **Kuai, L.**, J. Worden, S. Kulawik, K. Bowman, S. Biraud, V. Natraj, C. Frankenberg, D. Wunch, B. Connor, R. Shia, C. E. Miller, and Y. L. Yung (2013): Profiling Tropospheric CO₂ using the Aura TES and TCCON instruments, *Atmos. Meas. Tech.*, 6, 63–79, doi:10.5194/amt-6-63-2013.

7. Li, K.-F., B. Tian, K.-K. Tung, **L. Kuai**, J. R. Worden, and Y. L. Yung (2013), A link between tropical intraseasonal variability and polar stratospheric ozone, *Geophys. Res. Lett.*, 118, 4280–4289, doi:10.1002/jgrd.50391.
6. **Kuai, L.**, B. Connor, D. Wunch, R. Shia, C. E. Miller, and Y. L. Yung (2012): Vertically constrained CO₂ retrievals from TCCON measurements, *J. Quant. Spectro. Rad. Trans.*, 113, 1753–1761, doi:10.1016/j.jqsrt.2012.04.024
5. **Kuai, L.**, V. Natraj, R. Shia, C. Miller, and Y. L. Yung, 2010: Channel Selection Using Information Content Analysis: A Case Study of CO₂ Retrieval From Near Infrared Measurements, *J. Quant. Spectro. Rad. Trans.*, 111, 1296–1304, doi: 10.1016/j.jqsrt.2010.02.011.
4. **Kuai, L.**, R. L. Shia, X. Jiang, K. K. Tung, and Y. L. Yung, 2009: The Modulation of the Period of the Quasi-Biennial Oscillation by the Solar Cycle, *J. Atmos. Sci.*, 66, 2418–2428, doi:10.1175/2009JAS2958.1.
3. **Kuai, L.**, R. L. Shia, X. Jiang, K. K. Tung, and Y. L. Yung, 2008: Non-stationary Synchronization of Equatorial QBO with SAO in Observation and Model, *J. Atmos. Sci.*, 66, 1654–1664, doi:10.1175/2008JAS2857.1.
2. **Kuai, L.**, F. L. Haan, W. A. Gallus, and P. P. Sarkar, 2008: CFD simulations of the flow field of a laboratory-simulated tornado for parameter sensitivity studies and comparison with field measurements, *Wind and Structures*, 11, 75–96.
1. Tian, B., Y. L. Yung, D. E. Waliser, T. Tyranowski, **L. Kuai**, E. J. Fetzer, and F. W. Irion, 2007: Intraseasonal variations of the tropical total ozone and their connection to the MJO, *Geophys. Res. Lett.* 34, L08704, 10.1029/2007GL029471.

SELECTED CONFERENCE PRESENTATIONS

27. **Kuai, L.**, K. W. Bowman, H. M. Worden, K. Li, R. L. Herman, S. S. Kulawik (2016): Hydrological controls on the tropospheric ozone greenhouse gas effect using AURA TES observations, AURA science team meeting, 2016, Rotterdam, the Netherland (oral).
26. **Kuai, L.**, J. Worden, E. Campbell, S. Kulawik, M. Lee, R. Weidner, K. Li, S. Montzka, F. Moore, J. Berry, I. Baker, S. Dennin, H. Bian, K. Bowman, J. Liu, Y. Yung (2016): Constraints on carbonyl sulfide tropical ocean flux from satellite observations: ARUA TES, The first OCS workshop, 2016, Finland (oral).
25. **Kuai, L.**, J. Worden, S. Kulawik, K. Bowman, S. Biraud, C. Frankenberg, D. Wunch, B. Connor, R. Shia, C. E. Miller, and Y. L. Yung (2015), Profiling Tropospheric CO₂ using Aura TES and TCCON instruments, AIRS science team meeting (oral).
24. **Kuai, L.**, J. Worden, E. Campbell, S. Kulawik, M. Lee, R. Weidner, K. Li, S. Montzka, F. Moore, J. Berry, I. Baker, S. Dennin, H. Bian, K. Bowman, Y. Yung (2014): Free tropospheric observations of Carbonyl Sulfide from Aura Tropospheric Emission Spectrometer over ocean, Geophysical Research Abstracts, Vol. 16, EGU2014-4516 (oral).
23. **Kuai, L.**, J. Worden, E. Campbell, S. Kulawik, M. Lee, R. Weidner, K. Li, S. Montzka, F. Moore, J. Berry, I. Baker, S. Dennin, H. Bian, K. Bowman, Y. Yung (2014): A Large Missing Source for Carbonyl Sulfide from the Tropical Ocean? The EOS Aura Science Team Meeting.
22. **Kuai, L.**, J. Worden, Elliott Campbell, S. S. Kulawik, S. A. Montzka, and Jiabin Liu (2013), Constrain Carbonyl Sulfide Ocean flux using free tropospheric observations from Aura Tropospheric Emissions Spectrometer, 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec (poster)
21. **Kuai, L.**, J. Worden, S. S. Kulawik, and S. A. Montzka (2013), TES carbonyl sulfide (OCS) retrieval algorithm and preliminary results, TES science meeting 2013 (oral)
20. **Kuai, L.**, J. Worden, S. S. Kulawik, and S. A. Montzka (2013), TES carbonyl sulfide (OCS) retrieval algorithm and preliminary results, 2013 NASA Terrestrial Ecology Science Team Meeting (poster)
19. **Kuai, L.**, J. Worden, S. Kulawik, K. Bowman, S. Biraud, C. Frankenberg, D. Wunch, B. Connor, R. Shia, C. E. Miller, and Y. L. Yung (2012), Estimates of boundary layer CO₂ by combining TCCON and TES data, *European Geosci. Union*, Vol. 14, EGU2012-879 (oral)
18. **Kuai, L.**, J. Worden, S. Kulawik, K. Bowman, S. Biraud, C. Frankenberg, D. Wunch, B. Connor, R. Shia, C. E. Miller, and Y. L. Yung (2011), Comparison of free tropospheric CO₂ from TCCON profile retrievals to those from TES and AIRS, A33C-0216, presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec (poster).

17. Miller C., **L. Kuai**, B. Connor, D. Wunch, R-L. Shia, G. Toon, P. Wennberg, and Y. Yung, 2011, Retrieval of CO₂ vertical profile information from TCCON, *European Geosci. Union*, Vol. 13, EGU2011-9572 (poster).
16. **Kuai, L.**, Xun Jiang, Mao-chang Liang, Run-Lie Shia and Yuk Yung, 2010, Oceanic Sources of CO₂ in the Southern Hemisphere, Pan Ocean Remote Sensing conference (PORSEC) Taiwan (oral).
15. **Kuai, L.**, B. Connor, D. Wunch, R. Shia, C. E. Miller, G. C. Toon, P. O. Wennberg, and Y. L. Yung, 2011: Vertically constrained CO₂ retrievals from TCCON and Channel Selection. OCO2/ACOS Algorithm meeting (oral).
14. **Kuai, L.**, B. Connor, D. Wunch, R. Shia, C. E. Miller, G. C. Toon, P. O. Wennberg, and Y. L. Yung, 2010: Vertically constrained CO₂ retrievals from TCCON measurements. *EOS Transactions American Geophysical Union*, A51C-0121 (poster).
13. **Kuai, L.**, Vijay Natraj, Run-Lie Shia, Susan Kulawik, Kevin Bowman, Charles Miller, Bill Irion, Yuk Yung, 2009, Channel Selection for CO₂ Retrieval Using Near Infrared Measurements. Gordon Research Conference (GRC), Radiation & Climate (poster).
12. **Kuai, L.**, V. Natraj, R. Shia, C. Miller, and Y. L. Yung, 2009: Channel Selection for CO₂ Retrieval Using Near Infrared Measurements. *EOS Transactions American Geophysical Union*, Vol. 90(52), A51A-0083 (poster).
11. **Kuai, L.**, V. Natraj, R. Shia, S. Kulawik, C. Miller, B. Irion, and Y. L. Yung, 2009: CO₂ Vertical Profile Constraints from OCO and Thermal IR Measurements. *European Geophysical Union*, Vol. 11, Apr 19-24, 2009 (poster).
10. **Kuai, L.**, V. Natraj, R. Shia, S. Kulawik, K. Bowman, C. Miller, B. Irion, and Y. L. Yung, 2009: Simultaneous CO₂ Retrieval Using Near Infrared and Thermal Infrared Measurements, *Panchromatic Retrieval Workshop* (oral).
9. **Kuai, L.**, V. Natraj, R. Shia, S. Kulawik, C. Miller, B. Irion, and Y. L. Yung, 2008: CO₂ Vertical Profile Constraints from OCO and Thermal IR Measurements. *EOS Transactions American Geophysical Union*, Vol. 89(53), A41D-0134, Dec 15-19, 2008 (poster).
8. Li, K., A. Chung, **L. Kuai**, X. Zhang, J. S. Margolis, C. E. Miller, and Y. L. Yung, 2008: Spaceborne Measurements of the Column Averaged Methane Dry Air Mole Fraction. *EOS Transactions American Geophysical Union*, Vol. 89(53), GC51A-0681, Dec 15-19, 2008 (poster).
7. **Kuai, L.**, R. Shia, X. Jiang, K. Tung, and Y. L. Yung: Influence of the solar cycle on the Quasi-Biennial Oscillation period. *EOS Transactions American Geophysical Union*, Vol. 88(52), GC31B-0341, Dec. 10-14, 2007 (poster).
6. **Kuai, L.**, R. Shia, X. Jiang, K. Tung, and Y. L. Yung: Study of the nonlinear interaction between QBO and solar cycle in stratospheric ozone using THIN AIR model. *EOS Transactions American Geophysical Union*, Vol. 87, A21F-0890, Dec. 11-15, 2006 (poster).
5. Yung, Y. L., B. Tian, D. Waliser, T. Tyranowski, and **L. Kuai**, Intraseasonal variations of the tropical total O₃ and its connection to the MJO. *EOS Transactions American Geophysical Union*, Vol. 87, A24B-06, Dec. 11-15, 2006 (oral).
4. Feldman, D., **L. Kuai**, V. Natraj, and Y. L. Yung, Introduction Tools for Radiative Transfer Models, *EOS Transactions American Geophysical Union*, Vol. 87, ED43B-0939, Dec. 11-15, 2006 (poster).
3. Gallus, W. A., F. L. Haan, P. P. Sarkar, **L. Kuai**, and J. Wuman: Comparison of numerical model and laboratory simulator tornado wind fields with radar observations of the Spencer, South Dakota tornado, *Symp. On the Challenges of Severe Convective Storms*, 86th AMS Annual Meeting, Atlanta, GA, American Meteorological Society, 2006.
2. Sarkar, P. P., F. L. Haan, Jr., W. A. Gallus, **L. Kuai**, R. Kardell, J. Wurman: A Laboratory Tornado Simulator: Comparison of Laboratory, Numerical and Full-Scale Measurements, *the 10th Americas Conference*, Baton Rouge, May 31, 2005.
1. Gallus, W. A., P. P. Sarkar, F. L. Haan, **L. Kuai**, R. Kardell and J. Wuman: A Translating Tornado Simulator For Engineering Tests: Comparison of Radar, Numerical Model, and Simulator Winds, *the 22nd conference on Severe Local Storms*, Hyannis, MA, Oct. 2004.

CURRENT STUDENTS

- James Stinecipher (Ph.D student, UC, Merced)
 - Examining the use of satellite measurements of carbonyl sulfide to constrain tropical gross primary production in global ecosystem models
- Kyle Weng:
 - Studying the uptake of OCS over Alaskan and North American continents.

FORMER STUDENTS

- 2015: Zhao-Cheng Zeng (Visiting graduate student; now postdoc at Caltech)
 - Studied terrestrial OCS/CO₂ relative uptake over North American continents.
- 2013–2014: Jiabin Liu (Caltech Summer Undergraduate Research Student; now a UC Berkeley graduate student)
 - Retrieved Atmospheric Composition for Ecosystem Studies
- 2010: W.-Y. Marie Lau (Visiting Summer Undergraduate Research Student; now a UC Santa Cruz graduate student)
 - Simulated changes in spectrally resolved outgoing longwave radiation over the tropical ocean resulted from climate change between 1970 and 2008.

OTHER WORKING EXPERIENCE

- 2004 – 2005: Orientation Aid, International Education Service, Iowa State University

ACTIVITIES

- 2010: NCAR Summer Workshop on Mathematics of Climate Change — Student
- 2004: The 22nd conference on Severe Local Storms at Hyannis, MA — Attendee
- Sep 2004 – May 2005: National Collegiate Weather Forecasting Contest — Participant
- Jun 2004: Tornado tracer at west Iowa — Student volunteer

HONORS

- 2009: Winner (poster), UCLA Earth and Planetary Inter-collegiate Student Research Symposium
- 2005: Winner (Scientific Content), The Annual Graduate Meteorology Club Poster Contest
- 2003: Outstanding Graduate of Nanjing University, China
- 2000 – 2002: People's Scholarship for Academic Excellence, Nanjing University, China

PROFESSIONAL MEMBERSHIPS

- 2012 – present: European Geosciences Union, regular member
- 2012 – present: American Geophysical Union, regular member
- 2004 – 2011: American Geophysical Union, student member
- 2004 – 2005: Iowa State University Graduate Meteorology Club, member